independent of the customary food of the species. When placed in the dark, the green organisms disappear and the death of the Amœba by hunger ensues. Colonies thrive in minute drops of water which would quickly foul were not the Zoöchlorellæ present to renew the supply of oxygen.

C. A. K.

ZOÖLOGY.

The Fossil Bisons of North America. — Mr. Frederic A. Lucas, Curator of the Division of Comparative Anatomy in the U. S. National Museum, has published a most valuable contribution to our knowledge of the Fossil Bisons of North America. His paper,[1] consisting of less than twenty pages of text, is illustrated by twenty half-tone plates, mostly of skulls and horn cores, reproduced from photographs, and representing nearly all of the authentic material of this character relating to the subject. Mr. Lucas has evidently given much time and great care to the preparation of this excellent paper, and has placed the subject, so far as is possible from the scanty material at present extant, on a sound basis. That such a review was much needed is evident, in view of his conclusions.

Seven species are recognized, the distinctive characters of which are based mainly on their horn cores, which he has found afford very good specific characters. The skulls, where available, are found to substantiate the differences shown by the horn cores. The teeth of the various species so closely resemble those of the existing Bison that no attempt has been made to name or identify individual teeth.

The localities from which Bison remains have been reported indicate that the group formerly occurred from Alaska southward to California, Arizona, and Florida; other localities are Idaho, Nebraska, Kansas, Texas, South Carolina, and Kentucky. They range in time from the Pleistocene to the present, and in all probability several of the species were contemporaneous. The seven species recognized by Mr. Lucas, with the localities at which their remains have been found, are as follows:

(1) *Bison bison* (Linn.). Subfossil and recent. Remains in a semi-fossil condition have been found at Big Bone Lick, Kentucky; Millwood, Kansas; loess of the Missouri in the Winnebago Reservation.

[1] The Fossil Bisons of North America, *Proc. U. S. National Museum*, vol. xxi, pp. 755–771, Pls. LXV–LXXXIV, with several text-figures.

(2) *Bison occidentalis* Lucas. Fort Yukon, Alaska, and Gove County, Kansas, in the Quaternary, the Kansas specimen being "a practically complete skeleton." This is a larger species than *B. bison*, with well-marked cranial differences.

(3) *Bison antiquus* Leidy. Big Bone Lick, Kentucky; Alameda County (post-Pliocene gravel) and Pilarcitos Valley, California (blue clay, twenty-one feet below the surface). *Bison californicus* Rhoads (*Proc. Acad. Nat. Sci.*, Phila., 1897, p. 501) was based on California specimens.

(4) *Bison crassicornis* Richardson. Eschscholtz Bay, Alaska. (*B. alaskensis* Rhoads, *loc. cit.*, p. 490).

(5) *Bison alleni* Marsh. Pleistocene, Blue River, near Manhattan, Kansas (type locality), and Snake River, near American Falls, Idaho. *Bison crampianus* Cope, 1894, from southern Kansas, is considered to be the same.

(6) *Bison ferox* Marsh. Pleistocene (?) of Nebraska.

(7) *Bison latifrons* (Harlan). Big Bone Lick, Kentucky (type locality), and Ohio, Texas, Mississippi, South Carolina, Georgia, and Florida. *Bos arizonica* Blake, from Arizona, is referred to this species.

In addition to the above, the following, described as species of Bison, have proved not to belong to this genus, namely, *Bos scaphoceras* Cope, from northern Nicaragua, which proves to be referable to the genus Ovis; and *Bison alticornis* Marsh, based on the horn cores of a Dinosaur (Triceratops), as determined later by Marsh himself.

J. A. A.

"Wild Animals I Have Known." [1] — This book is unique in conception and illustration, and the publishers have given it a daintiness of form quite in keeping with the delicacy of touch that marks its literary and artistic execution. The book is not only as pleasing to the eye as it is out of the ordinary in style of make-up, but is one of the most valuable contributions to animal psychology and biography that has yet appeared. Mr. Thompson is not only a naturalist and an animal artist of very high attainments, but is master of a literary style that is at once graphic and fascinating, though doubtless much of the charm of the book is due to his sympathetic love of the wild

[1] Thompson, Ernest Seton. *Wild Animals I Have Known*, and 200 drawings. Being the Personal Histories of Lobo, Silverspot, Raggylug, Bingo, the Springfield Fox, the Pacing Mustang, Wully, and Redruff. New York, Charles Scribner's Sons, 1898. 8vo, 358 pp., 30 pls.